

This print-out should have 40 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

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**Simplify Fract 04**  
**001 10.0 points**

Simplify

$$\frac{x^2 - 10x + 24}{x^2 - 36}.$$

1.  $\frac{x - 4}{x - 6}$
2.  $\frac{x - 4}{x + 6}$
3.  $\frac{x + 4}{x - 6}$
4.  $\frac{x^2 - 4}{x - 6}$
5.  $\frac{x^2 + 4}{x + 6}$
6.  $\frac{x + 4}{x + 6}$

7. None of these

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**Rational Fraction 17**  
**002 10.0 points**

Simplify

$$\frac{x^2 - 5x - 50}{x^2 + 2x - 3} \div \frac{x + 5}{x - 1}.$$

1.  $\frac{x + 10}{x + 3}$
2.  $\frac{x - 10}{x - 3}$
3.  $\frac{x - 10}{x + 3}$
4.  $\frac{x - 3}{x + 10}$
5.  $\frac{x + 3}{x + 10}$

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**Complex Fractions 7 6 58**  
**003 10.0 points**

Simplify the compound fraction

$$\frac{\frac{1}{x+4} + \frac{1}{4}}{\frac{3}{4x^2 + 32x + 64}}$$

1.  $\frac{(x+5)(x+8)}{2}$
2.  $\frac{(x+3)(x+6)}{2}$
3.  $\frac{(x+1)(x+4)}{2}$
4.  $\frac{(x+1)(x+5)}{3}$
5.  $\frac{(x+4)(x+8)}{3}$

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**Real Solutions P 4 98**  
**004 10.0 points**

Solve

$$\frac{4}{x} - \frac{5}{3} = \frac{x}{6}$$

algebraically.

1.  $x = -12, 2$
2. None of these
3.  $x = 2, 12$
4.  $x = 2, 6$
5.  $x = 0, 1$

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**Functions 1 1 30**  
**005 (part 1 of 3) 10.0 points**

For

$$f(x) = \sqrt{x+8} + 2,$$

a) find  $f(-3.7)$ .

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**006 (part 2 of 3) 10.0 points**

b) find  $f(7.4)$ .

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**007 (part 3 of 3) 10.0 points**

c) find  $f(x-8)$ .

1.  $\sqrt{x+8} - 6$
2.  $\sqrt{x+16} + 2$

3.  $\sqrt{x} + 2$

4.  $\sqrt{x-8} + 2$

5. None of these

6.  $\sqrt{x+8} - 2$

**Even and Odd 1 2 32****008 10.0 points**

Determine if

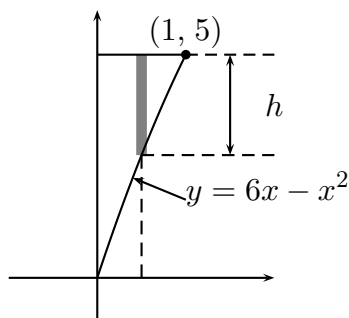
$$f(x) = x\sqrt{1-x^2}$$

is even, odd, or neither.

1. neither

2. even

3. odd

**Rectangle Height 1 2 72****009 10.0 points**Write the height  $h$  of the rectangle as a function of  $x$ .

1.  $h(x) = x$

2.  $h(x) = 5 + 6x - x^2$

3.  $h(x) = 1$

4.  $h(x) = 5 + 6x + x^2$

5.  $h(x) = 5 - 6x + x^2$

6. None of these

7.  $h(x) = 5 - 6x - x^2$

**Salary 12 3****010 10.0 points**

An office worker's starting salary was \$10880. With the cost of living increases, the worker's salary can be modeled by the function  $f(t) = 10880(1.02)^t$ , where  $t = 0$  corresponds to the worker's first year of employment. Each year, A \$120 bonus is available for the employees who receive high evaluations. If the employee receives this bonus each year, write a function called  $g(t)$  that models the worker's total income for each year  $t$ .

1.  $g(t) = 10760(1.02)^t$

2.  $g(t) = 120t + 11000(1.02)^t$

3.  $g(t) = 11120(1.02)^t$

4.  $g(t) = 10760(1.12)^t$

5.  $g(t) = 120 + 10880(1.02)^t$

6.  $g(t) = 11000(1.02)^t$

7.  $g(t) = 120t + 10880(1.02)^t$

8.  $g(t) = 10760(1.03103)^t$

9.  $g(t) = 10880(1.03103)^t$

**Domain 7 2 82****011 10.0 points**

Find the domain of

$$s(t) = \frac{4}{9-t^2}$$

1.  $t \geq 3$  or  $t \leq -3$

2.  $-3 \leq t \leq 3$

3.  $-3 < t < 3$

4.  $t > 3$  or  $t < -3$

5.  $t \neq \pm 3$

6. None of these

7. All t

**Functions 1 1 36****012 (part 1 of 3) 10.0 points**

For

$$f(x) = \begin{cases} x^2 + 2 & x \leq 1 \\ 2x^2 + 2 & x > 1 \end{cases},$$

a) find  $f(-4.3)$ .**013 (part 2 of 3) 10.0 points**b) find  $f(1)$ .**014 (part 3 of 3) 10.0 points**c) find  $f(7.8)$ .**Combination 1 4 40****015 (part 1 of 2) 10.0 points**

Consider

$$f(x) = \sqrt[3]{x+1} \quad \text{and} \quad g(x) = x^3 - 2$$

Find  $f \circ g$ .

1.  $\sqrt[3]{x+1} - 2$

2.  $\sqrt[3]{x^3 - 1}$

3.  $x - 1$

4.  $x^3 - 1$

5. None of these

6.  $\sqrt[3]{x^3 - 2} + 1$

**016 (part 2 of 2) 10.0 points**Find  $g \circ f$ .

1.  $x^3 - 1$

2. None of these

3.  $x - 1$

4.  $\sqrt[3]{x+1} - 2$

5.  $\sqrt[3]{x^3 - 2} + 1$

6.  $\sqrt[3]{x^3 - 1}$

**Cost 1 4 67****017 (part 1 of 2) 10.0 points**

The weekly cost of producing  $x$  units in a manufacturing process is given by the function  $C(x) = 20x + 250$ . The number of units produced in  $t$  hours is given by  $x(t) = 20t$ .

Find and interpret  $(C \circ x)(t)$ .

1.  $400t + 250$

2.  $40t + 250$

3. None of these

4.  $400t + 5000$

5.  $20t + 250$

**018 (part 2 of 2) 10.0 points**

Graph the cost as a function of time.

Find the time that must elapse until the cost increases to \$10000.

**StewartC5 01 03 54****019 10.0 points**

Use the table

$x$	1	2	3	4	5	6
$f(x)$	5	5	5	6	5	1
$g(x)$	2	3	4	1	3	2

to evaluate each expression:

(a)  $f(g(1))$

(d)  $g(g(1))$

(b)  $g(f(1))$

(e)  $(g \circ f)(3)$

(c)  $f(f(1))$

(f)  $(f \circ g)(6)$

1. (a) 3; (b) 4; (c) 3; (d) 4; (e) 0; (f) 7

2. (a) 5; (b) 3; (c) 3; (d) 5; (e) 3; (f) 5

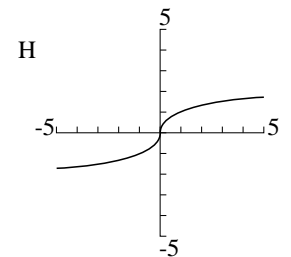
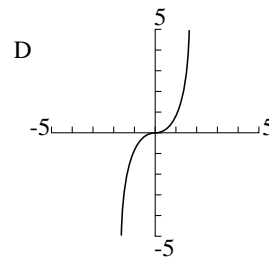
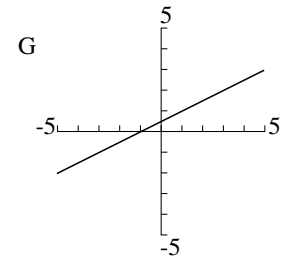
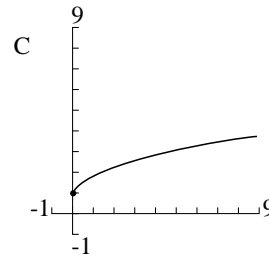
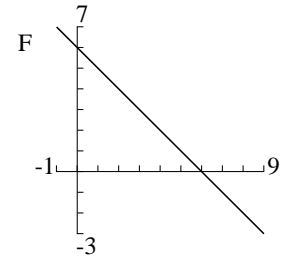
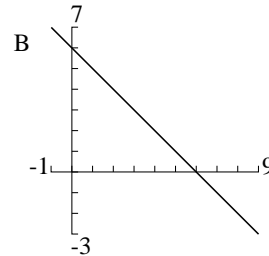
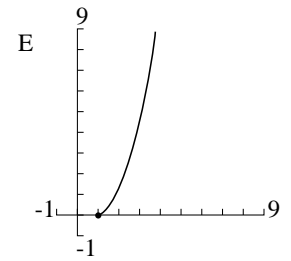
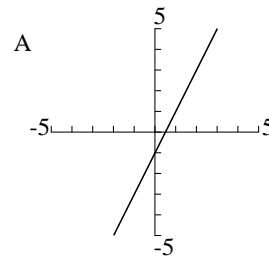
3. (a) 3; (b) 5; (c) 3; (d) 5; (e) 0; (f) 0

4. (a) 3; (b) 5; (c) 5; (d) 3; (e) 3; (f) 5

5. (a) 5; (b) 3; (c) 5; (d) 3; (e) 3; (f) 5

**Intercepts P 4 48****020 10.0 points**Find the  $x$ - and  $y$ -intercepts of the graph of

$$x^2y - x^2 + 4y = 0.$$



a) What is the inverse of graph A?

1. Graph G
2. Graph E
3. None of these
4. Graph H
5. Graph F

**022 (part 2 of 4) 10.0 points**

b) What is the inverse of graph B?

1. Graph H
2. None of these

1. no  $x$ -intercept;  $y$ -intercept  $(0, 0)$
2. None of these
3.  $x$ -intercepts  $(0, 0)$ ;  $y$ -intercept  $(0, 0)$
4.  $x$ -intercept  $(1, 0)$ ;  $y$ -intercept  $(0, 1)$
5.  $x$ -intercepts  $(0, 0)$  and  $(1, 0)$ ;  $y$ -intercept  $(0, 0)$

**Graph of Inverse 1 5 1****021 (part 1 of 4) 10.0 points**

3. Graph F

4. Graph E

5. Graph G

**023 (part 3 of 4) 10.0 points**

c) What is the inverse of graph C?

1. Graph H

2. None of these

3. Graph G

4. Graph F

5. Graph E

**024 (part 4 of 4) 10.0 points**

d) What is the inverse of graph D?

1. None of these

2. Graph E

3. Graph H

4. Graph F

5. Graph G

**Inverse Functions 1 5 78****025 10.0 points**

Find

$$f^{-1} \circ g^{-1}$$

if  $f(x) = x + 4$  and  $g(x) = 2x - 3$ .

1. None of these

$$2. (f^{-1} \circ g^{-1})(x) = \frac{1}{2x+5}$$

$$3. (f^{-1} \circ g^{-1})(x) = \frac{x-5}{2}$$

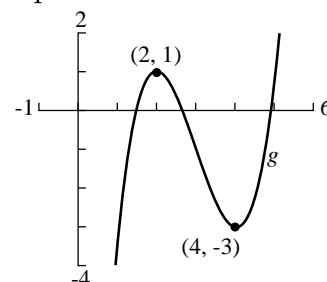
$$4. (f^{-1} \circ g^{-1})(x) = \frac{x+5}{2}$$

$$5. (f^{-1} \circ g^{-1})(x) = \frac{x-1}{2}$$

**Transformation 1 3 48****026 10.0 points**

Use the graph of

$$f(x) = x^3 - 3x^2$$

to write the equation for the function  $g$  below.

$$1. g(x) = (x-1)^3 - 3(x-1)^2 + 1$$

$$2. g(x) = (x-2)^3 - 3(x-2)^2 + 1$$

$$3. g(x) = (x-3)^3 - 3(x-3)^2 + 1$$

4. None of these

$$5. g(x) = (x+1)^3 - 3(x+1)^2 + 1$$

**Mortgage Debt 1 6 17****027 10.0 points**

The table gives the amount of mortgage debt (in billions of dollars) held by savings institutions  $x$  and commercial banks  $y$  for the year 1988 through 1992 in the United States.

Year	1988	1989	1990	1991	1992
$x$	925	910	802	705	628
$y$	674	767	845	876	895

Find a linear model for the data, and interpret the slope of the model in the context of the problem.

$$1. y = 3.14x + 1551.33$$

$$2. y = 1.75x + 1122.61$$

$$3. y = -2.45x + 1724.76$$

$$4. y = -0.64x + 1321.56$$

5. None of these

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**Extrema 1 2 54**  
**028 10.0 points**

Use a graphing utility to approximate any relative minimum or maximum values of the function

$$y = x^3 - 6x^2 + 15.$$

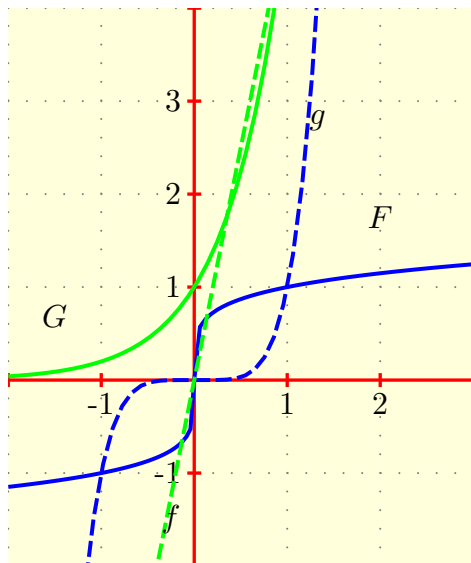
1. Minimum is 2, maximum is 5
2. Minimum is 0, maximum is 5
3. None of these
4. Minimum is 4, maximum is 8
5. Minimum is  $-1$ , maximum is 4

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**StewartC5 01 02 04**  
**029 10.0 points**

For the following, let

- (a)  $y = \sqrt[5]{x}$    (b)  $y = x^5$    (c)  $y = 5^x$   
 (d)  $y = 5x$



Match each equation with its graph. (Don't use a computer or graphing calculator.)

1. (a)  $F$ ; (b)  $G$ ; (c)  $g$ ; (d)  $f$
2. (a)  $F$ ; (b)  $g$ ; (c)  $G$ ; (d)  $f$
3. (a)  $g$ ; (b)  $G$ ; (c)  $f$ ; (d)  $F$

4. (a)  $f$ ; (b)  $g$ ; (c)  $G$ ; (d)  $F$

5. (a)  $g$ ; (b)  $F$ ; (c)  $G$ ; (d)  $f$

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**PreC1a12**  
**030 10.0 points**

Simplify the expression

$$f(x) = \frac{\sqrt{4xy^4} \sqrt{12x^6y^7}}{\sqrt{3x^{-1}y^4}},$$

as much as possible, leaving at most one radical and no negative exponents.

1.  $f(x) = 3x^4y^3\sqrt{y}$
2.  $f(x) = 3x^5y\sqrt{yx}$
3.  $f(x) = 3x^4y^3$
4.  $f(x) = 3x^5y$
5.  $f(x) = 4x^4y^3\sqrt{x}$
6.  $f(x) = 4x^4y^3\sqrt{y}$

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**Equation P R 68**  
**031 10.0 points**

Solve

$$\sqrt{3x-2} = 4-x$$

and use a graphing utility to verify your solution.

1.  $x = 3$  only
2.  $x = \frac{4}{3}$  only
3.  $x = 2$  only
4.  $x = -\frac{2}{3}$  only
5. None of these

6.  $x = 2, 9$

7.  $x = 0, 2$

**Log 3 2 52****032 (part 1 of 3) 10.0 points**

Consider

$$g(x) = \log_4(x).$$

a) Find its domain.

1. None of these

2.  $(0, \infty)$ 3.  $(-\infty, 0]$ 4.  $(-\infty, \infty)$ 5.  $[0, \infty)$ 6.  $[1, \infty)$ 7.  $(-\infty, 0)$ **033 (part 2 of 3) 10.0 points**

b) Find the vertical asymptote.

1.  $x = 4$ 2.  $y = 0$ 

3. None of these

4.  $y = -4$ 5.  $y = 4$ 6.  $x = 0$ **034 (part 3 of 3) 10.0 points**c) Find the  $x$ -intercept of the function.1.  $(0,0)$ 2.  $(1,0)$ 3.  $(-1, 0)$ 4.  $(4,0)$ 5.  $(-4, 0)$ 

6. None of these

**Exponential 3 2 14****035 10.0 points**

Write

$$10^{-4} = 0.0001$$

in logarithmic form.

1.  $\log_{0.0001} 0.0001 = 4$ 2.  $\log_{10} 4 = -0.0001$ 3.  $\log_{10} 0.0001 = 4$ 

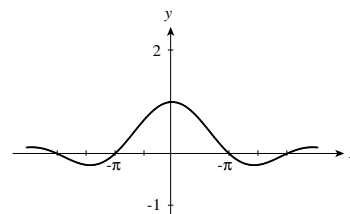
4. None of these

5.  $\log_{10} 0.0001 = -4$ **Trig Graph 5 3 60****036 (part 1 of 5) 10.0 points**

Consider the function

$$f(x) = \frac{\sin x}{x}$$

and its graph shown in the figure.



a) What is the domain of the function?

1. None of these

2.  $x > 0$ 3.  $x \in R$ 4.  $x < 0$ 5.  $x \in R, x \neq 0$ **037 (part 2 of 5) 10.0 points**

b) Identify any symmetry of the graph.

- |   |                  |
|---|------------------|
| 1. The graph has $y$ -axis symmetry.                  | 1. 4             |
| 2. The graph has symmetry with respect to the origin. | 2. 3             |
| 3. The graph has no symmetry.                         | 3. 2             |
| 4. The graph has $x$ -axis symmetry.                  | 4. 1             |
|   | 5. None of these |

**038 (part 3 of 5) 10.0 points**

c) Identify any asymptotes of the graph.

1. The graph has no asymptote.
2. The graph has a horizontal asymptote at  $y = 0$ .
3. The graph has a horizontal asymptote at  $y = 1$ .
4. The graph has a vertical asymptote at  $x = 1$ .
5. None of these
6. The graph has a vertical asymptote at  $x = 0$ .

**039 (part 4 of 5) 10.0 points**d) Describe the behavior of the function as  $x \rightarrow 0$ .

1.  $f(x) \rightarrow 1$
2.  $f(x) \rightarrow 0$
3. None of these
4.  $f(x) \rightarrow \frac{\pi}{2}$
5.  $f(x) \rightarrow \infty$

**040 (part 5 of 5) 10.0 points**

e) How many solutions does the equation

$$\frac{\sin x}{x} = 0$$

have in the interval  $[-8, 8]$ ?